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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/043,194	01/14/2002	Wen-Yuch Jang	4006-145	6170

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EXAMINER

TRAN, TAN N

ART UNIT	PAPER NUMBER
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2826

DATE MAILED: 10/31/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/043,194	Applicant(s) JANG, WEN-YUEH	
	Examiner TAN N TRAN	Art Unit 2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on amendment filed on 08/21/03.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5, 7-26 and 36-45 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-5 and 7-26 is/are allowed.
- 6) ☒ Claim(s) 36, 37, 39, 40 and 45 is/are rejected.
- 7) ☒ Claim(s) 41-44 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01/14/02 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
 If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
 * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

1. If applicant is aware of any relevant prior art, he/she requested to cite it on form PTO-1449 in accordance with the guidelines set forth in M.P.E.P.

609.

Drawings

2. Figures 1, 2, 3 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 36,37,39-40,45 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant' prior art (APA) in view of Clevenger et al. (6,399,447).

With regard to claims 36,45, APA discloses a deep trench structure 16; a bottom plate 20 on an interface region of the substrate 1 and a lower sidewall portion of the deep trench structure; a dielectric layer 20 formed on an internal surface of the bottom plate 18; a top plate 22, formed by filling the deep trench structure and covering the dielectric layer 20 with a conductive material; a first collar portion being on an adjacent portion of two the neighboring capacitors; a second collar portion being on a non-adjacent portion of two the neighboring capacitors; a second collar portion being on a non-adjacent portion of two of the neighboring capacitors; and a buried strap conductive layer 26 on the second collar portion. (Note figs. 1,2 of APA).

APA does not disclose the first collar portion being longer than the second collar portion in a depth direction of the deep trench.

However, Clevenger et al. discloses the first collar portion being longer than the second collar portion in a depth direction of the deep trench. (Note fig. 1 of Clevenger et al.).

Therefore, it would have been obvious to one of ordinary skill in the art to form the APA's device having the first collar portion being longer than the second collar portion in a depth direction of the deep trench such as taught by Clevenger et al. in order to prevent leakage currents at the surface.

Applicant's claim 37 does not distinguish over Clevenger et al. and APA references regardless of the process used to form the bottom plate such as "thermal diffusion with an impurity gas".

Note that a "product by process" claim is directed to the product per se, no matter how actually made, *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See also *In re Brown*, 173 USPQ 685; *In re Luck*, 177 USPQ 523; *In re Wertheim*, 191 USPQ 90 (209 USPQ 554 does not deal

with this issue); In re Fitzgerald, 205 USPQ 594, 596 (CCPA); In re Marosi et al., 218 USPQ 289 (CAFC); and most recently, In re Thorpe et al., 227 USPQ 964 (CAFC, 1985) all of which make it clear that it is the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that, as here, an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Note that Applicant has burden of proof in such cases, as the above case law makes clear.

With regard to claim 39, Clevenger et al. discloses a depth of the second collar portion being the same as a depth of the top plate. (Note fig.1 of Clevenger et al.).

With regard to claim 40, Applicant' prior Art (APA) and Clevenger et al. disclose all the claimed subject matter except for a thickness of the first collar portion and the second collar portion is about 400. ANG. to 500. ANG. However, it would have been obvious to one of ordinary skill in the art to have a thickness of the first collar portion and the second collar portion is about 400. ANG. to 500. ANG. in order to decrease a leakage current at surface of trench.

Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant' prior art (APA) in view of Clevenger et al. (6,399,447) further in view of Holmes et al. (6,316,309).

With regard to claim 38, APA and Clevenger et al. do not disclose the top plate comprises a polysilicon layer doped with arsenic.

However, Holmes et al. discloses the top plate comprises a polysilicon layer doped with arsenic. (Note lines 22-33, column 9, figs. 14,16 of Holmes et al.).

Therefore, it would have been obvious to one of ordinary skill in the art to form the APA and Clevenger et al.'s device having the top plate comprises a polysilicon layer doped with arsenic such as taught by Holmes et al. in order to facilitate electron transfer through the buried strap.

Allowable Subject Matter

4. Claims 41-44 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 41-44 are allowable over the prior art of record, because none of these references disclose or can be combined to yield the claimed invention such as the trench top isolation connects with the shallow trench isolation regions in a word line direction as recited in claim 41.

5. Claims 1-5,7-14,15-26 are allowable over the prior art of record, because none of these references disclose or can be combined to yield the claimed invention such as the active areas and the shallow trench isolations being alternatively and parallel arranged on the substrate as recited in claim 1, and the trench top isolation connects with the shallow trench isolation regions in a word line direction as recited in claim 15.

Response to Arguments

6. Applicant's arguments filed 08/21/03 have been fully considered but they are not persuasive.

It is argued, at page 14 of the remarks, that "in Fig.2 of the applicant's prior art and Fig. 1 of Clevenger, the buried strap is on the longer collar oxide portion. Therefore, the combination of the applicants prior art and Clevenger does not meet amended claim 36." However, fig. 2 of APA does show a buried strap conductive layer 26 on the second collar portion. Since claim 36 does not recite a buried strap conductive layer directly formed on the second collar portion, applicant's claim 36 does not distinguish over APA and Clevenger et al. references.

Conclusion

7. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.


8. Any inquiry concerning this communication or earlier communication from the examiner should be directed to Tan Tran whose telephone number is (703) 305-3362. The examiner can normally be reached on M-F 8:30AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on (703) 308-6601. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for after final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

TT

Oct 2003


Minhloan Tran
Primary Examiner
Art Unit 2826